

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

Application of: Ramesh Keshavaraj
(Milliken & Company, Assignee)

Reissue Application No.: Unknown (based on US Pat. No. 6,294,487)

Filed: Concurrently

For: **AIRBAG FABRIC PROCESSING VERY
LOW COVER FACTOR**

Group Art Unit: 1771
Examiner: Singh, A.

STATUS OF CLAIMS AND SUPPORT FOR CLAIM CHANGES

Box Reissue
Honorable Commissioner of Patents
Washington, D.C. 20231

Sir:

The status of the claims as a result of the amendment submitted herewith is:

Claims cancelled: none

Claims amended: 1, 2, 6, 7, 10, 11, 14, 15, and 18

Claims added: 21-42

Support for the amendments submitted herewith is as follows:

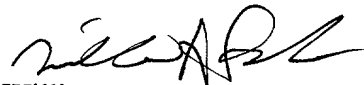
The removal of the words "coating or laminated" and replacing such language with a limitation of a film adhered to the target fabric in the amended claims noted above finds support in originally filed Examples 1-6.

The new claims 21-39 find support for coated airbag fabrics of low cover factor find support at col. 4, lines 52-61, and in Example 7, as originally filed.

The new claims 40-43 find support within originally filed Examples 4 and 5 and within issued Claims 4 and 5, at least.

Respectfully submitted,

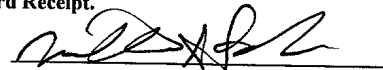
February 4, 2002



William S. Parks
Attorney for Assignee
Registration Number 37, 528
Telephone: (864) 503-1537

CERTIFICATE OF EXPRESS MAILING

I hereby certify that this correspondence is being deposited with the United States Postal Service as "Express Mail" Identification number EL825877453US in an envelope addressed to Box Patent Application, The Commissioner of Patents, Washington, DC 20231, on February 4, 2002, along with (1) a copy of the original US Patent No. 6,294,487, (2) a declaration and power of attorney, (3) a Preliminary Amendment, (4) an Offer to Surrender the original letters patent, (5) the Assent by Assignee to File, (6) a Statement on the Status of the Claims and Support for Claim Amendment, (7) the original letters patent, and (8) a Post Card Receipt.


William S. Parks, Attorney for Assignee

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

Application of: Ramesh Keshavaraj
(Milliken & Company, Assignee)

Serial Number: Unknown (based on US Pat. No.
6,294,487)

Filed: Concurrently

For: **AIRBAG FABRIC PROCESSING
VERY LOW COVER FACTOR**

Group Art Unit: 1771
Examiner: Singh, A.

PRELIMINARY AMENDMENT IN REISSUE APPLICATION

Box Reissue
Honorable Commissioner of Patents
Washington, D.C. 20231

Sir:

Please amend U.S. Pat. No. 6,294,487, granted on September 25, 2001, to Ramesh Keshavaraj, entitled AIRBAG FABRIC PROCESSING VERY LOW COVER FACTOR, as follows:

AMENDMENT**IN THE TITLE:**

Replace the title with the following:

--AIRBAG FABRIC POSSESSING VERY LOW COVER FACTOR--

IN THE SPECIFICATION:

The first full paragraph in column 3 has been amended to read:

--To achieve these and other objects and in accordance with the purpose of the invention, as embodied and broadly described herein, the present invention provides an airbag fabric for incorporation within an airbag cushion comprising a woven fabric substrate, at least a portion of which is coated or laminated, wherein said woven fabric substrate has a cover factor below about 1900, preferably below about 1775, more preferably below about 1750, and most preferably, for laminated fabric, below about 1600, and wherein the air permeability of said airbag fabric is less than about 0.5 cfm under 124 Pa pressure at about 25°C. The utilization of a coating or laminate (i.e., film) provides the desired low degree of air permeability over the covered portion of the airbag fabric. In this instance, the term "laminate" is intended to encompass a continuous film which is bonded to the fabric structure through the utilization of a bonding agent. Thus, such a bonding agent may be applied first to the fabric surface and then covered by the laminate. Or, the bonding agent may be incorporated on the side of the laminate which is to be in contact with the fabric surface. The

film structure of the laminate thus differs significantly from the standard airbag coatings previously used in such applications since the laminate is continuous, must be adhered to the surface through the utilization of such a bonding agent, and is applied to the fabric as a film. Coatings generally are applied through a method in which the coating material is of very high viscosity (i.e., from about 10,000 to about 100,000 centipoise at 1 atmosphere and 25°C) and applied by a standard coating mechanism (such as a knife coater). Such coatings would only be applied to fabric substrates which possess cover factors of between 1600 and 1900 since, even though the viscosities of such coatings would be extremely high and thus allow for maximum adhesion to the individual yarns, the spaces between such yarns would be too voluminous to permit sufficient, continuous filling of such spaces too provide the necessary air permeability of fabric substrates possessing densities below about 1600.--

The second full paragraph in column 4 has been amended to read:

--The general method followed in adhering the laminate to the target airbag fabric surface comprises coating the fabric with the bonding agent; laminating the desired film to at least a portion of the treated fabric by running the fabric through a heated nip roll including the to-be-applied film; and heating the resultant composite to a bonding temperature of between about 270 and 450°F; more preferably from about 290 to about 400°F; most preferably from about 300 to about 350°F. This high temperature effectuates the desired bonding of the film to the fabric surface through the melting of the film materials which then

deform to meet the contours and dimensions of the fabric surface. Upon cooling the adhered, deformed film retains its structural integrity as a laminate over the entire treated fabric surface, which fills the spaces between the loosely packed yarns. The laminate is flexible enough to permit sufficient inflation upon a collision event to provide a cushion to a passenger or driver; however, the film also exhibits a rigidity over the individual yarns such that the yarns do not much appreciably from their set woven pattern. As such, the laminate, in filling the interstitial spaces between the yarns as well as preventing movement of the yarns from their set pattern, thus provides the airbag fabric (and consequently the airbag cushion) with a remarkably reliable manner of reducing air permeability through the fabric structure. Such a novel procedure thus accords the artisan with a manner of utilizing inexpensively produced fabric exhibiting a low cover factor (below about 1900) to produce an effective airbag fabric and cushion for utilization within a vehicle restraint system.--

IN THE CLAIMS:

1.(Amended) An airbag fabric for incorporation within an airbag cushion comprising a woven fabric substrate, at least a portion of which is adhered to a film, wherein said woven fabric has a cover factor below about 1900, and wherein the air permeability of said airbag fabric is less than about 0.5 cfm under 124 Pa pressure at about 25°C.

2.(Amended) The airbag fabric of claim 1 wherein said woven fabric substrate is adhered to a film comprising materials selected from the group consisting of polyurethane, polyacrylate, polyamide, polyester, and copolymers thereof.

10.(Amended) The airbag fabric of claim 4 wherein said film comprises polyurethane.

11.(Amended) The airbag fabric of claim 10 wherein the thickness of said film is from 0.1 to about 3.5 mils.

14.(Amended) The airbag fabric of claim 3 wherein said film comprises polyurethane.

15.(Amended) The airbag fabric of claim 14 wherein the thickness of said film is from 0.1 to about 3.5 mils.

18.(Amended) The airbag fabric of claim 1 wherein the thickness of said film is from 0.1 to about 3.5 mils.

ADD THE FOLLOWING NEW CLAIMS:

- 21.(New) An airbag fabric for incorporation within an airbag cushion comprising a woven fabric substrate, at least a portion of which is coated with materials selected from the group consisting of polyurethane, polyacrylate, polyamide, polyester, and copolymers thereof, wherein said woven fabric substrate has a cover factor below about 1900, and wherein the air permeability of said airbag fabric is less than about 0.5 cfm under 124 Pa pressure at about 25°C.
- 22.(New) The airbag fabric of Claim 21 wherein said cover factor below about 1800.
- 23.(New) The airbag fabric of Claim 22 wherein said cover factor below about 1775.
- 24.(New) The airbag fabric of Claim 23 wherein said cover factor below about 1750.
- 25.(New) The airbag fabric of Claim 22 wherein said coating comprises polyurethane.
- 26.(New) The airbag fabric of Claim 23 wherein said coating comprises polyurethane.
- 27.(New) The airbag fabric of Claim 24 wherein said coating comprises polyurethane.

28.(New) The airbag fabric of Claim 21 wherein the thickness of said coating is from 0.1 to about 3.5 mils.

29.(New) The airbag fabric of Claim 25 wherein the thickness of said coating is from 0.1 to about 3.5 mils.

30.(New) The airbag fabric of Claim 26 wherein the thickness of said coating is from 0.1 to about 3.5 mils.

31.(New) The airbag fabric of Claim 27 wherein the thickness of said coating is from 0.1 to about 3.5 mils.

32.(New) An airbag cushion comprising the airbag fabric of Claim 21.

33.(New) An airbag cushion comprising the airbag fabric of Claim 25.

34.(New) An airbag cushion comprising the airbag fabric of Claim 26.

35.(New) An airbag cushion comprising the airbag fabric of Claim 27.

36.(New) An airbag cushion comprising the airbag fabric of Claim 28.

37.(New) An airbag cushion comprising the airbag fabric of Claim 29.

38.(New) An airbag cushion comprising the airbag fabric of Claim 30.

39.(New) An airbag cushion comprising the airbag fabric of Claim 31.

40.(New) An airbag fabric for incorporation within an airbag cushion comprising a woven fabric substrate, at least a portion of which is coated or adhered to a film, wherein said woven fabric has a cover factor below about 1775 and fibers having deniers equal to or less than 525, and wherein the air permeability of said airbag fabric is less than about 0.5 cfm under 124 Pa pressure at about 25°C.

41.(Amended) The airbag fabric of claim 40 wherein said woven fabric substrate is adhered to a film comprising materials selected from the group consisting of polyurethane, polyacrylate, polyamide, polyester, and copolymers thereof.

42.(New) The airbag fabric of Claim 40 wherein said woven fabric has a cover factor below about 1750 and fibers having deniers equal to or less than 420.

43.(New) The airbag fabric of Claim 42 wherein said woven fabric has a cover factor below about 1750 and fibers having deniers equal to or less than 420.

REMARKS

The claims remaining after this request for reissue are 1-43. No claims have been deleted. Claims 1, 2, 6, 7, 10, 11, 14, 15, and 18 have been amended. Claims 21-43 have been added. The title as issued was incorrect from that of the application as originally filed and thus has been corrected to remedy the simple misspelling of the word "possessing" as "processing". The specification has been amended to merely reflect the fact that cover factors of at most 1775 and 1750 and preferred embodiments of the inventive fabric. Such limitations were originally included within the claims but were omitted by mistake from the specification. Thus, no new matter has been added to correct for this.

The amendments to the Claims, as well as the newly added claims, have been submitted in an effort to correct for a mistake regarding the misconception of previously produced airbag fabrics. In particular, it recently came to the attention of the inventor that the woven fabric at least similar in cover factor weave structure to that of his Example 7, but coated with thick silicone-based coatings for low permeability (not with other types, such as lower density polyurethanes, polyacrylates, and the others now present within independent claim 21), was produced and sold commercially at a date uncertain in terms of his filing date, but most likely at a date more than one year prior to such a filing date (e.g., prior to September 24, 1998). Thus, in an effort to correct for the broad limitations of

patented Claim 1 in U.S. Pat. No. 6,294,487 (which basically encompasses any coated or laminated airbag fabric exhibiting a cover factor below 1900 and a very low air permeability), Assignee now requests the amendments as submitted above. Clearly, the Examples 1-6 include airbag fabrics included a film adhered thereto and of very low cover factors and thus do not include any new matter. Claims 21-39 encompass coated airbag fabrics of very low cover factors, but which are basically not coated with silicones (which require very thick add-on weights to provide the desired low air permeabilities). Proper basis for such claims is found on col. 4, lines 52-61, as well as in Example 7. No new matter has been added. Claims 40-43 also find support within the original claims, Examples 4 and 5, and within the first amended paragraph noted above. Thus, no new matter has been added. Entry and due consideration of such preliminary amendments are thus earnestly solicited.

Respectfully submitted,



William S. Parks

Attorney for Assignee


Registration Number 37, 528

Telephone: (864) 503-1537

February 4, 2002

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William S. Parks, Attorney for Assignee

MARKED-UP VERSION OF AMENDMENTS TO U.S. PAT. NO. 6,296,919

IN THE SPECIFICATION:

The first full paragraph in column 3 has been amended to read:

--To achieve these and other objects and in accordance with the purpose of the invention, as embodied and broadly described herein, the present invention provides an airbag fabric for incorporation within an airbag cushion comprising a woven fabric substrate, at least a portion of which is coated or laminated, wherein said woven fabric substrate has a cover factor below about 1900, preferably below about 1775, more preferably below about 1750, and most preferably, for laminated fabric, below about 1600, and wherein the air permeability of said airbag fabric is less than about 0.5 cfm under 124 Pa pressure at about 25°C. The utilization of a coating or laminate (i.e., film) provides the desired low degree of air permeability over the covered portion of the airbag fabric. In this instance, the term "laminate" is intended to encompass a continuous film which is bonded to the fabric structure through the utilization of a bonding agent. Thus, such a bonding agent may be applied first to the fabric surface and then covered by the laminate. Or, the bonding agent may be incorporated on the side of the laminate which is to be in contact with the fabric surface. The film structure of the laminate thus differs significantly from the standard airbag coatings previously used in such applications since the laminate is continuous, must be adhered to the surface through the utilization of such a bonding agent, and is applied to the fabric as a film. Coatings generally are applied through a method in which the coating material is of very high viscosity (i.e., from about 10,000 to about 100,000 centipoise at 1 atmosphere and [25EC]

25°C) and applied by a standard coating mechanism (such as a knife coater). Such coatings would only be applied to fabric substrates which possess cover factors of between 1600 and 1900 since, even though the viscosities of such coatings would be extremely high and thus allow for maximum adhesion to the individual yarns, the spaces between such yarns would be too voluminous to permit sufficient, continuous filling of such spaces too provide the necessary air permeability of fabric substrates possessing densities below about 1600.--

The second full paragraph in column 4 has been amended to read:

The general method followed in adhering the laminate to the target airbag fabric surface comprises coating the fabric with the bonding agent; laminating the desired film to at least a portion of the treated fabric by running the fabric through a heated nip roll including the to-be-applied film; and heating the resultant composite to a bonding temperature of between about 270 and [450EF] 450°F; more preferably from about 290 to about [400°] 400°F; most preferably from about 300 to about [350EF] 350°F. This high temperature effectuates the desired bonding of the film to the fabric surface through the melting of the film materials which then deform to meet the contours and dimensions of the fabric surface. Upon cooling the adhered, deformed film retains its structural integrity as a laminate over the entire treated fabric surface, which fills the spaces between the loosely packed yarns. The laminate is flexible enough to permit sufficient inflation upon a collision event to provide a cushion to a passenger or driver; however, the film also exhibits a rigidity over the individual yarns such that the yarns do not much appreciably from their set woven pattern. As such, the laminate, in filling the interstitial spaces between the yarns as well as preventing movement of the yarns

from their set pattern, thus provides the airbag fabric (and consequently the airbag cushion) with a remarkably reliable manner of reducing air permeability through the fabric structure. Such a novel procedure thus accords the artisan with a manner of utilizing inexpensively produced fabric exhibiting a low cover factor (below about 1900) to produce an effective airbag fabric and cushion for utilization within a vehicle restraint system.--

IN THE CLAIMS:

- 1.(Amended) An airbag fabric for incorporation within an airbag cushion comprising a woven fabric substrate, at least a portion of which is [coated or laminated] adhered to a film, wherein said woven fabric has a cover factor below about 1900, and wherein the air permeability of said airbag fabric is less than about 0.5 cfm under 124 Pa pressure at about 25°C.
- 2.(Amended) The airbag fabric of claim 1 wherein said woven fabric substrate is [coated or laminated with a coating or] adhered to a film comprising materials selected from the group consisting of polyurethane, polyacrylate, polyamide, polyester, and copolymers thereof.
- 10.(Amended) The airbag fabric of claim 4 wherein said [coating or laminate] film comprises polyurethane.

11.(Amended) The airbag fabric of claim 10 wherein the thickness of said [coating or laminate] film is from 0.1 to about 3.5 mils.

14.(Amended) The airbag fabric of claim 3 wherein said [coating or laminate] film comprises polyurethane.

15.(Amended) The airbag fabric of claim 14 wherein the thickness of said [coating or laminate] film is from 0.1 to about 3.5 mils.

18.(Amended) The airbag fabric of claim 1 wherein the thickness of said [coating or laminate] film is from 0.1 to about 3.5 mils.